



Volume: 04 Issue: 01 | 2023 ISSN: 2660-454X

<https://cajitmf.centralasianstudies.org>

The Role of Corporate Heterogeneity in the Relationship Between Credit Risk Management and Bank Performance

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Received 09th Nov 2022,

Accepted 10th Dec 2022,

Online 11th Jan 2023

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Abstract: This research paper sought to determine the role of corporate (board) heterogeneity in the relationship between credit risk management and bank's financial performance in Nigeria. For the purpose of this research, the ex post facto research design was adopted and data collected through the process of contents analysis from a sample of 10 deposit money banks for a period of ten (10) years from 2010 to 2019. Two panel least squares models were specified to determine the extent of effect of corporate heterogeneity on the relationship between the dependent and independent variables. Findings of the research show that corporate (board) heterogeneity plays an important role in moderating the relationship between credit risk management activities of banks and their financial performance. This is considering that the coefficient of determination (R²) for the moderating role is significantly larger 40.42% compared to 27.02% when excluded. This implies that a heterogeneous board of directors are sensitive and play an important role in determining the credit risk exposures of banks. Thus, it is recommended that banks ensure that their boards of directors are adequately diversified. Secondly, the inclusion of more independent board members is also recommended. Regulators of the industry can also be instrumental in ensuring that banks constitute heterogeneous boards of directors by making policies in that direction.

Key words: Credit risk management, bank performance, non-performing loans ratio, capital adequacy ratio, loan to deposit ratio, net income margin.

Introduction

Providing credit facilities to customers is one of the major functions of banks. This function also provides banks with the bulk of their revenue which is generated through interest income from borrowers. Creation not only benefit banks but also the wider economy as it facilitates economic activities by mobilizing

financial resources from surplus (depositors) economic units and makes same available at a cost (interest charge) to deficit (borrowers) economic units. However, the credit creation function of banks is fraught with risks as not all credit facilities extended to customers can be recovered in full. This is compounded by the fact that most of the funds extended as credit facilities by banks are mobilized in the form of deposits. Thus, default risk resulting from the inability of the borrower to perform according to repayment terms not only the individual bank but also those who have entrusted their financial resources to the bank.

Notwithstanding the attendant risks, banks cannot adopt avoidance as a credit risk management method because as already stated, credit creation is the most important source income without which a bank (Boateng, 2020; Echobu & Okika, 2019). The underlying risks of providing credit facilities remain a critical issue affecting the performance of banks in Nigeria (Echobu & Okika, 2019). This is because in addition to large amount of funds that are lost to default and non-performing loans, banks are also expected to make huge financial provisions for loan losses and potential future loan losses. Furthermore, banks tie up huge amount of resources (which could otherwise be profitably invested in other revenue generating activities) in the form of cash and other types of reserves as safety net against significant losses arising from credit creation. Insuring depositors funds with National Deposit Insurance Corporation (NDIC) also wittle down the tradeable assets and thus the financial performance of banks.

As espoused in the agency theory, managers are prone to focus on income generating activities (as it increases compensation packages and incentives) to the detriment of the safety of the organisation (Akram, Muhammad, Natarajan, & Chellakan, 2020). This is also the case in banks in Nigeria where quite a number of banks have run into crisis as a result of accumulation of large portfolios of non-performing (toxic assets) loans. As a matter of fact, the establishment of the Asset Management Corporation of Nigeria (AMCON) was necessitated by the alarming quantum on non-performing loans portfolios of banks in Nigeria. As of end 2020, the total number of non-performing loans (toxic assets) AMCON has taken of the balance sheets of deposit money banks was about 12,537 NPLs accounts amounting to over N5 trillion (NGN) (AMCON, 2021; Iyatse & Oyebade, 2021).

Researchers have attributed the rate of non-performing loans in Nigerian banks to the propensity of managers to disregard guidelines in pursuit of profitability (Afolabi, Opeyemi, Kamar & Emeje, 2021; Echobu & Okika, 2019). However, agency theory proposes that mechanisms in corporate governance can be used to curb the excesses of managers as agents of the organisation. One of such mechanisms is the composition/constitution of the board of directors which in various forms have been documented to influence management decisions and propel the organisation towards better performance. In this research paper, we evaluate the role of corporate (board) heterogeneity in the relationship between credit risk management and the financial performance of deposit money banks in Nigeria.

Statement of the Problem

At the helm of affairs of decision making in corporate organisations is the board of directors. And as have been documented in numerous previous empirical research, the constitution of the board of directors in corporate organisations have considerable effect on their financial performance (Chinedu, Akwuobi & Onyeogubalu, 2021; Onyali & Okerekeoti, 2018; Kim, Rasheed, 2013; Wahid, 2012). From the number of individuals in the board, its constitution in terms of gender, independence (executive, non-executive), shareholders' representation, professional and academic qualification among other demographics that define or constitute the board of directors have been variously studied and shown to have some measure of influence on how decisions are made and the final outcome (performance) of the corporations.

As reported by Wahid (2012), chief executive officers (CEO) are more likely to perform better when the board of directors consists of a diverse groups as such a board are more likely to recommend the replacement of the CEO in the event of infractions (excessive compensation) and not-so-impressive

performance. This as he noted is because heterogeneity in boards increase independence through perspective (opinion and experience) diversification. A heterogeneous board also enjoys better access to information and resources. In an earlier research, Hanson, Pesaran, and Schuermann (2008) revealed that board a heterogeneous board tends to overestimate credit risk thus improving diversification of risky credit portfolios of banks.

However, other researches have also pointed out that heterogeneous also pose challenges and problems from different directions. First, a heterogeneous will tend to take much longer to reach decision and increased internal conflict and divisiveness and dissention is documented in such boards. In addition, CEOs tend to act with animosity towards boards that perceive as being overly heterogeneous - especially where there is the feeling or knowledge that such a board was imposed on the CEO either by regulators or investors (Simons & Peterson, 2000; Hermalin & Weisbach, 2003; Wall & Nolan, 1986).

The focus of this research is on the role of corporate (board) heterogeneity on the relationship between credit risk management and the financial performance of deposit money banks in Nigeria. We concede that previous research on the relationship between credit risk and its management and relationship with financial performance of banks abound in Nigeria (Afolabi, Opeyemi, Kamar, & Emeje, 2021; Adegbe & Otitolaiye, 2020; Echobu & Okika, 2019; Onyefulu, Okoye & Orjinta, 2019; Kajola, Adedeji, Olabisi & Babatolu, 2018; Taiwo, Ucheaga, Achugamonu, Adetiloye, Okoye & Agwu, 2017; Kolapo, Ayeni, & Oke, 2012). However, none have considered how such relationship is mediated by the heterogeneity of board of director.

Aim and Objectives of the Research

The purpose of this research is to investigate the role of corporate heterogeneity in the relationship between credit risk management and the financial performance of deposit money banks in Nigeria. This will be achieved using the following objectives:

1. Evaluate the role of corporate (board) heterogeneity in the relationship between non-performing loans ratio and the financial performance of deposit money banks
2. Evaluate the role of corporate (board) heterogeneity in the relationship between capital adequacy ratio and the financial performance of deposit money banks
3. Evaluate the role of corporate (board) heterogeneity in the relationship between loan to deposit ratio and the financial performance of deposit money banks

Theoretical Review

Agency theory is a corporate principle that provides and explanation and possible resolution to problems or other issues that may arise from the relationship between business principal or owner and their agents or representatives. Most often, that relationship is described as one between shareholders, as principals, and company executives, as agents. The relationship between these parties is fraught with challenges as a result of the individual or self-interests of the parties. The corporate governance mechanism is among several that are proposed to deal with the principal agent problems.

The essence of advocating corporate (board) heterogeneity is to strengthen corporate governance and enhances its ability to protect the interest of the corporation's owners. Thus, corporate heterogeneity can be viewed from the perspective of being one of the numerous corporate governance tools intended to find solution to conflict associated with the principal-agent (agency theory) relationship. According to Haniffa and Cooke (2005) cited in Onyali and Okerekeoti (2018), agency theory proposes that a corporate organisations capabilities can be considerably improved to deal with present and future challenges through effective corporate governance. They contended that internal firm governance structure and mechanisms must be strengthened and act effectively to hold the firms agent (managers) accountable for

their actions and inactions. Thus, corporations through governance mechanisms are constantly in search of effective means to keep the excesses of managers in check. Corporate heterogeneity to some degree fits the bill in this sense as it is touted by many proponents as a mechanism that improves the quality of deliberations and decisions in corporations given the independence of individuals that usually emerge through corporate heterogeneity (Wahid, 2012).

Hambrick and Mason (1984) cited in Akram, Muhammad, Natarajan, and Chellakan, (2020) asserted that directors from different nationalities and backgrounds offer different of cognitive skills and capabilities to the decision making process which ultimately contributes to creative strategic decisions in the organization. In the context of banks and credit risk management, Onyali and Okerekeoti (2018) asserted that heterogeneous boards improves risk management in banks, Hanson, Pesaran, and Schuermann (2008) proposed that heterogeneous boards tend to overestimate credit risk thus improving diversification of risky credit portfolios of banks. Thus, while management may focus more on returns (as this would guarantee higher compensation) at the expense of the safety of the corporation, a heterogeneous board will with a focus on the safety and longevity of the corporation ensure that the credit portfolio id properly diversified to protect investors.

Credit Risk Management

Banks have two primary functions visaviz; deposit taking and credit creation. And connected to these two core functions are risks - liquidity risk which involves the banks' ability to meet its obligation to depositors at all times and credit risk which captures the risk that borrowers may be unable to meet liquidate maturing obligations to the banks. The symbiotic nature of these two functions and associated risks are such that it is difficult to properly separate them. For example, Banks' credit creation ability depends to a large extent on its ability to mobilize saving (deposit) from surplus economic units; and the ability to meet obligations owed depositors is inherently linked to the banks' ability recover credit facilities extended to deficit economic units. Consequently, issues relating to credit risk management are inexorably linked to deposit (liquidity) risk management.

According to Ekinici, and Poyraz (2019), credit creation is the primary revenue generating activity of commercial banks. Afolabi, Opeyemi, Kamar and Emeje (2021) further stated that bank credit also facilitates economic activities and enhances the capability and economic performance of individuals, business organisations and government. However, the process of credit creation carries with it large potential risks in terms of both the lender and the borrower. For example, risk involving customers to whom credit facilities have been extended to failing to fulfill the contractual obligations on time or at any later time may considerably endanger the banks operations - this is particularly true where high net worth individuals and organisations are involved. Further, a bank with a high credit risk has a high bankruptcy risk that jeopardize the safety of funds of depositors. In view of the serious consequences of arising from this primary activity of banks, credit risk management by banks has evolved to become a focal activity in banking operations Afolabi, et. al, (2021).

The risk management process in most industries starts with first identifying the nature, sources and likely consequences of the risk. Understanding the nature of the risk and its sources will provide an idea as to how to go about mitigating its likely consequences. Boateng (2020) stated that credit risk identification involves identifying the various risks associated with the transaction and examining it to understand its likely impact on the portfolio and capital requirements.

Echobu and Okika (2019) citing Hou and Dickinson (2007) identified two indicators from which credit risk can emanate to include non-performing loans and capital adequacy. While non-performing loans relates to loans that are not generating income (nor paying back interest) as and when due as a result of inability on the part of the debtor to perform. When the number or quantum of non-performing loans is high, it is likely to result in credit risk - especially if the capital of the bank is inadequate to cover the

level of non-performing loans. The Economic Times Bureau (2010) in Echobu and Okika (2019) characterized capital adequacy as a measure that captures how much of a bank's capital denoted by its net worth can mitigate the unfavorable impact of its risky loans (Economic Times Bureau, 2010). Capital adequacy provides bedrock to help the bank absorb the shock attributable to losses arising from bad and non-performing loan facilities.

Haven identified the principal components to which its credit creation activities is linked, the next step involves measuring the risk factors in its credit creation activities, the next step involves measuring the risk component to determine the extent of exposure that the bank is faced with. Credit risk measurement, the bank can understand the magnitude of potential losses it faces and can take proactive action by making additional provisions to cover the risk. Risk measurement can also serve as a signpost of risky territory into which the bank should avoid going by raising a red flag before that point is reached. For example, capital adequacy ratio should be able to determine what size of loan portfolio the current capital of the bank can adequately cater for. The non-performing loans ratio will also provide a warning of when the loan portfolio becomes or is being over-burdened by bad debt. These in addition to other measures such liquidity ratio and loan to deposit all provide measurement criteria for credit risk management.

The next step in credit risk management is risk monitoring which essentially involves keeping a close watch on measurement models and ratios - the objective being to identify a potential credit risks before it fully manifests. Red flags may include ratios falling below predetermined levels. For example, an unexpected short fall in expected cash inflow may result in a build-up of matured obligations. Christoffersen (2012) stated that a robust process for risk management must of necessity include a system of control internal to the organisation that is appropriate for the structure and complexity of transaction in the individual organisation.

Through the internal control system, the organisation monitors the effectiveness of its credit management strategies to identify potential problems and take action proactively. This will require the establishment and implementation of control policies that allows the organisation to act promptly on identified potential credit risks (Christoffersen, 2012). Furthermore, the internal control function for credit risk management allows for setting limits on identified operations and transactions that have the potential to exacerbate problems. Finally, there must be a continual review of the credit risk management processes and strategies to determine where adjustments may be required and where entire strategies may need to be abandoned if necessary.

Corporate Heterogeneity

Corporate (board) heterogeneity which is also referred to as corporate (board) diversity is characterized by the demographic diversity of the members of the board of directors of a corporate organisation. Corporate heterogeneity can defined in terms of gender heterogeneity which involves the mix of male and female members in a board of directors. Corporate heterogeneity can also be defined in terms of the mix of executive and non-executive members that constitute a board of directors. Other heterogeneity markers within a board include but not related to age, expertise, experience, professional/educational qualification among others. According to the Association of Chartered Certified Accountants (2018), intuitively, diversity means having a range of many people that are different from each other. However, traditionally speaking, in an attempt to define board diversity or heterogeneity, one can consider factors like age, race, gender, educational background and professional qualifications of the directors to make the board less homogenous. Others have also interpreted board diversity by taking cognisance of such less tangible factors like life experience and personal attitudes. In all, corporate heterogeneity is a corporate governance mechanism promoted to improve decision making process and infuse more independence and reduce group think.

ACCA (2018) further listed the benefits of corporate heterogeneity to include: more effective decision making; better utilisation of the talent pool; and enhancement of corporate reputation and investor relations by establishing the firm as a responsible corporate citizen that is sensitive to societal demands. Kim and Rasheed (2013) opined that board heterogeneity that reflects diverse functional areas, technologies, markets and competitive facets contributes to greater informational comprehensiveness in the assessment of strategic options. In Addition, Wahid (2012) further stated that heterogeneous boards come with diverse knowledge, opinions, expertise and experience which all tends to enrich decision making process in the organisation. Several research have also pointed out that corporate heterogeneity can also breed animosity and divisiveness in the board of directors thus detracting from organisational performance (Hanson, Pesaran & Schuermann, 2008). However, regulators across the world continue to push for greater diversity in boards as empirical evidence appears to predominantly point towards its advantages. For example, gender diversity in boards is now a compulsory consideration for any board selection.

Heterogeneous board members will most likely to possess a variety of personal characteristics, experiences, qualifications, resulting in dissimilar leadership and organisational styles, emotional styles, thinking and even risk preferences and behaviours. In addition to the fact that this may foster creativity in finding solutions to challenges, a better oversight to functions in operations of the organisation as such a board will be sensitive to issues relating to reputation and compliance with regulations (ACCA, 2018).

The Nexus: Empirical Review

Related empirical research on the subject matter of this research is divided into two strands. One are those focusing on how credit risk and credit risk management affect the financial performance of banks and the second strand are those whose focus is on the relationship between corporate (board) heterogeneity in banks and other corporations and financial performance of corporate organisations. Thus, our empirical review also follow the trend in literature to review them in line with existing literature starting from corporate heterogeneity.

Akram, et. al, (2020) used a sample 375 listed corporate organisations in Pakistan for the period spanning 2010 to 2016 to evaluate the relationship between board heterogeneity and corporate performance. The research which adopted the use of a heterogeneity index and analysed with OLS regression technique revealed that social and gender heterogeneity had a negative effect on firm performance while heterogeneity in terms of nationality demonstrated a positive effect on organisational financial performance.

Onyali and Okerekeoti (2018) in their research which was conducted to determine the effect of board heterogeneity on financial performance of organisation in Nigeria used a sample of thirty two (32) corporations listed on the Nigeria Stock Exchange from which data was collected from audited annual reports. Findings of the research garnered from the OLS regression method indicated that board size, women on board and board independence have significant and positive effect on return on assets of listed manufacturing firms in Nigeria - thus concluding that corporate heterogeneity enhances the financial performance of corporate organisations.

Kim and Rasheed (2013) in their research on board of directors' heterogeneity and stability in financial performance of corporate organisation developed a number of multi-theoretic hypotheses that incorporated board resources, independence, and dynamics. Findings of the research provided evidence that board heterogeneity tenure, and educational specialty and functional experience was related to the stability of financial returns. The research further revealed that increase in ownership position by directors of corporations and institutional investors strengthens the relationship between board heterogeneity and stability of returns. They concluded that board heterogeneity increases organizational

rationality and further the stability in firm performance through its more effective control and counsel functions to management.

Afolabi, Opeyemi, Kamar, and Emeje (2021) adopted the panel data analysis technique to investigate the relationship between credit risk and the performance of deposit money banks in Nigeria for a period of 10 years spanning 2009 to 2018. The research measured credit risk in terms of non-performing loans in addition to loans and advances while bank performance was measured using return on assets (ROA). Findings of the research revealed that loan to deposit ratio had a negative relationship with bank performance while non-performing loans had a positive relationship with bank performance. The research thus recommended a continuous process of monitoring loans and advances portfolios in order to avoid a mismatch in assets and liabilities and term structure of their lending portfolios.

In the United Arab Emirate, Al-Zaidanin and Al-Zaidanin (2021) evaluated the influence of credit risk management on the financial performance of banks. For the purpose of the research, the proxied credit risk management as non-performing loans ratio; capital adequacy ratio; liquidity ratio; cost to income ratio; and loans to deposit ratio. Using a sample of sixteen (16) commercial banks for a period spanning 2013 to 2019. Results from the which were obtained from the random effect model provided evidence to the effect that non-performing loans ratio and cost to income ration both significantly retarded the profitability of commercial banks while all other independent variables had a non-significant positive influence on profitability. The research thus suggested that banks can minimize credit risk attributed to non-performing loans by conducting a thorough due diligence on those they intend to extend credit to mitigate the rate of failure in loan repayment. It is further suggested that banks improve their asset utilization and liquidity in order to improve profitability.

In a similar research in South Africa, Cheng, Nsiah, Ofori, and Ayisi (2020) adopted the smart PLS-SEM technique to evaluate how credit risk, operational risk, and liquidity risk related with the profitability of commercial banks. Using a sample of banks listed on the JSE with data covering 2012 to 2018, findings of the research led to the conclusions that all credit risk measures had a significant positive effect on profitability measured as return on asset (ROA), return on equity (ROE), and net income margin (NIM). In the same vein, all measures of liquidity risk also had positive significant relationship with profitability while operational risk revealed a negative relationship with profitability. The researchers recommended that management review their internal and external operations, and further decrease their leverage levels in order to reduce credit and liquidity risks.

Adegbie, and Otitolaiye (2020) in their research on credit risk and how it affects the financial performance of deposit money banks in Nigeria utilized a sample of 13 banks for the period spanning 2006 to 2018. The research revealed that credit management had a positive and significant relationship with financial performance; credit risk with bank size had also had a significant relationship with financial performance. The study concluded that credit management influences the financial performance of Deposit Money Banks in Nigeria. The study recommended that management of the MBD should design and maintain a robust credit management strategy and framework as well as stringent credit policy that would decrease nonperforming loan and default level, and improve their performance level in Nigeria.

Ndyagyenda (2020) sought to establish the relationship between credit risk management and the financial performance of a commercial bank in Tanzania. The research employed the case study design. Findings of the research obtained from OLS regression results revealed that there is a significant relationship between client appraisal, credit risk control, and risk diversification and financial performance thus leading to the conclusion that credit appraisal defines a bank's survival and profitability. The research thus recommended that the bank's management should continuously review the risk management

practices and strategies to ensure practicability in the presence of constantly evolving operating environment.

Echobu and Okika (2019) investigated the effect of credit risks on the financial performance of deposit money banks in Nigeria. Data was collected from a sample of 15 banks extracted from their audited annual reports for the period 2006 to 2017. Results obtained through the OLS regression analysis indicated that non-performing loans and impairment loan charge-off both had a significantly negative effect on financial performance of banks. Further, capital adequacy also had a negative but statistically non-significant relationship with financial performance. The researchers recommended that deposit money banks should improve risk management strategies and in order to curb loan defaults.. Review of prudential guidelines by the apex bank to mitigate industry-wide credit risk problems.

Onyefulu, Okoye, and Orjinta (2019) evaluated the relationship between financial risks plaguing deposit money banks in Nigeria and Ghana and their financial performance. 20 banks from both countries were sampled for a period of 10 years ranging from 2009 to 2018 using data extracted from their audited annual reports and analysed using OLS multiple regression and Pearson correlation techniques. Findings of the research indicated that liquidity risk had a significantly negative relationship with bank performance in both countries. On the other hand, operational risk was shown to have a significantly positive relationship with performance in both countries. The researchers thus recommended that recommended among others that, Deposit Money Banks in Nigeria and Ghana should deposit money banks comply with relevant provisions of banking laws in both countries.

Ekinci and Poyraz (2019) conducted an investigation on the impact of credit risk on the corporate performance of deposit (commercial) banks in Turkey. The research sample consisted of twenty six (26) commercial banks whose data were extracted from the statistical reports on banking operations published by Turkey's Bank Association for the period 2005 to 2017. Using the panel data OLS technique, findings of the research indicated that there was a negative relationship between credit risk and financial performance vis-à-vis; ROA and ROE. The research recommended that banks should pay more attention to credit risk management, especially as it concerns monitoring and control of non-performing credit facilities.

Mei, Nsiah, Barfi, and Bonsu (2019) sought to establish the linkage between credit risk management and the profitability of commercial banks domiciled and listed in the Ghanaian stock market. Findings of the research which were based on the OLS econometric model revealed that non-performing loan ratio had a significantly negative effect on return on assets while cost per loan asset had a positive effect on return on assets. Based on the findings of the research, it was recommended that commercial banks in the country adopt efficient credit risk management strategy help boost profitability.

Kajola, Adediji, Olabisi, and Babatolu (2018) affirming the importance of credit facilities provided to corporations in enhancing economic development, the researchers sought to determine how risks associated with credit extension affected the financial performance of deposit money banks in Nigeria.

The research spanned a period of 12 years from 2005 to 2016 using data extracted from the annual reports of a sample of 10 banks, the findings of the research obtained through the use of random effects and generalised least squares (GLS) regression methods indicated that all credit risk measurement parameters had a significant relationship with the financial performance of banks. It was thus recommended that banks' managements develop rigorous and robust credit management policies to enhance the process of assessing the credit worthiness of customers before granting their loan request.

Taiwo, Ucheaga, Achugamonu, Adetiloye, Okoye and Agwu (2017) investigated the implications of credit risk management on the performance of banks in Nigeria. Using data from the CBN statistical bulletin and the World Bank - which spanned 17 years from 1998 to 2014 and applying the OLS multiple

regression method of analysis, findings of the research revealed that sound credit management strategies adopted by commercial can enhance stakeholders - more especially - investors and depositors confidence in the banking system and also improve profitability and growth of the banks. The research thus recommended strict adherence to credit appraisal policies which ensures that only credit worthy borrowers have access to loanable funds.

Kolapo, Ayeni, and Oke (2012) evaluated the effect of credit risk on the financial performance of commercial banks in Nigeria. The research which spanned a period of 11 years from 2000 to 2010 used sample data from 5 commercial banks and analysed research using the OLS panel regression model revealed that credit risk had a negative effect on financial performance of commercial banks. Further, non-performing credit facilities resulted in decrease in bank profitability. The research thus recommended that commercial banks enhance their capacity in credit analysis and loan administration to forestall the risk associated with non-performing loans as a result of loan default. Furthermore, regulators should be stricter in demanding compliance relevant laws and policies relating to credit extension and associated risk.

Methodology

This research set out to evaluate the inter-mediatory role of corporate (board) heterogeneity in the relationship between credit risk management and the financial performance of deposit money banks in Nigeria. For the purpose of this research, twelve (12) deposit money bank listed on the Nigeria Stock Exchange (NSE) were selected for the research on the basis of availability of relevant financial records. Data was collected from secondary sources – specifically from the audited annual financial statements and accounts of the sample deposit money banks. The period covered in the research is ten (10) years from 2010 to 2019. Variable of the research are credit risk management (CRKM) measured using non-performing loan ratio (NPLR); capital adequacy ratio (CADR); and loans to deposit ratio (LDPR). Banks' financial performance (BKFP) was measured as net income margin (NIMG). Finally the moderating role of corporate (board) heterogeneity (BHGT) was captured using gender diversity (GNDV) which was measured as ratio of female to male board of directors' members. Finally, the interaction (INTR) between credit risk management measures (NPLR; CADR; LDPR) and moderating variable (GNDV) is captured as shown in the model below. Panel least square (PLS) multiple regression technique for data analyses. Two models were propose – First in which the corporate (board) heterogeneity was captured merely as a variable in the relationship between the credit risk management and banks' performance and; second model in which the interaction between credit risk management and corporate (board) heterogeneity is included. The effect size (measured as R-Squared) of both models are compared to determine the model with the greater effect on bank performance. Further, the direction of the regression coefficients in both models will also be compared to analyse any significant differences in effect(s). The proposed relationship is that banks' financial performance is a function of credit risk management and mediated by corporate (board) heterogeneity. This is stated econometrically as:

Model 2:

$$NIMG = \alpha_0 + \alpha_1 NPLR + \alpha_2 CADR + \alpha_3 LDPR + \alpha_4 GNDV + e \dots \dots \dots (1)$$

Model 2:

$$NIMG = \alpha_0 + \alpha_1 NPLR + \alpha_2 CADR + \alpha_3 LDPR + \alpha_4 GNDV + \alpha_5 NPLR * GNDV + \alpha_6 CADR * GNDV + \alpha_7 LDPR * GNDV + e \dots \dots \dots (2)$$

For brevity, the interaction effects are renamed as:

$$NPLR * GNDV = INTRC1; CADR * GNDV = INTRC2; LDPR * GNDV = INTRC3$$

Thus, model 2 is restated as:

$$NIMG = \alpha_0 + \alpha_1 NPLR + \alpha_2 CADR + \alpha_3 LDPR + \alpha_4 GNDV + \alpha_5 INTR1 + \alpha_6 INTR2 + \alpha_7 INTR3 + e \dots \dots$$

... (2)

All variables and measures as defined above.

Given the mediating role of corporate (board) heterogeneity, it is expected that risk management activities of banks will lead to improved financial performance.

Research Data and Results

Table 1: Regression Output with Interaction Effects Included as Moderators

Dependent Variable: NIMG

Method: Panel Least Squares

Date: 08/08/22 Time: 18:55

Sample: 2010 2019

Periods included: 10

Cross-sections included: 10

Total panel (balanced) observations: 100

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.419707	0.643893	0.651827	0.5161
NPLR	-1.657725	0.672667	-2.464405	0.0156
CADR	-0.070262	0.060172	-1.167685	0.2460
LDPR	0.501190	0.109124	4.592851	0.0000
GNDV	-1.921643	2.112374	-0.909708	0.3654
INTR1	4.950511	2.184876	2.265809	0.0258
INTR2	0.389876	0.206320	1.889670	0.0620
INTR3	-1.289559	0.323388	-3.987652	0.0001
R-squared	0.404219	Mean dependent var		0.106298
Adjusted R-squared	0.358888	S.D. dependent var		0.252738
S.E. of regression	0.202366	Akaike info criterion		- 0.280861
Sum squared resid	3.767576	Schwarz criterion		- 0.072448
Log likelihood	22.04306	Hannan-Quinn criter.		- 0.196513
F-statistic	8.917029	Durbin-Watson stat		0.897370
Prob(F-statistic)	0.000000			

In Table 1 above, bank performance proxied as net income margin (NIMG) and credit risk management measured in terms of non-performing loans ratio (NPLR); Capital adequacy ratio (CADR); and loan to deposit ratio (LDPR). The moderating variable is corporate heterogeneity measured using board gender diversity (GNDV) - while the interaction between the moderating variable and credit risk management measures is captured as INTR1, INTR2, and INTR3. From the results, it is observed that non-performing loans ratio (NPLR) had a negative and statistically significant relationship with net income margin (NIMG). The coefficient of regression value of -1.6577 implying that a unit increase in non-performing loans is predicted to lead a decrease in net income margin (NIMG). Similarly, the relationship between

capital adequacy ratio (CADR) and net income margin is negative by non-significant. With a coefficient of regression value of -0.0702 and loan to deposit ratio (LDPR) had a positive and statistically significant relationship with coefficient of regression value of 0.5012 with the implication that increase in loan to deposit ratio helps to improve financial performance in terms of net income margin. In summary, all included explanatory and interaction variables can predict about 40.42% of the variation in performance of banks.

Table 2: Regression Output with Corporate Heterogeneity Excluded

Dependent Variable: NIMG

Method: Panel Least Squares

Date: 08/08/22 Time: 18:52

Sample: 2010 2019

Periods included: 10

Cross-sections included: 10

Total panel (balanced) observations: 100

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.150902	0.113699	-1.327205	0.1876
NPLR	-0.113272	0.042560	-2.661460	0.0091
CADR	0.044875	0.012117	3.703434	0.0004
LDPR	0.077841	0.025356	3.069868	0.0028
GNDV	0.119777	0.277857	0.431074	0.6674
R-squared	0.270227	Mean dependent var		0.106298
Adjusted R-squared	0.239500	S.D. dependent var		0.252738
S.E. of regression	0.220404	Akaike info criterion		-0.138001
Sum squared resid	4.614911	Schwarz criterion		-0.007742
Log likelihood	11.90003	Hannan-Quinn criter.		-0.085283
F-statistic	8.794367	Durbin-Watson stat		0.732615
Prob(F-statistic)	0.000004			

The result shown in table 2 (model 2) is similar to table 1 (other than the constant term which is discountenanced). Here we observe a negative and statistically significant relationship between non-performing loans and net income margin of banks. Further, both capital adequacy ratio and loan to deposit ratio both had a positive and statistically significant relationship with banks' financial performance. Finally, all included explanatory variables (with corporate heterogeneity excluded) can explain about 26.88% of the variations in banks' financial performance.

It is observed that when the interaction effects are included - as shown in table 1, the coefficient of determination (R²) is much larger 0.4042 (40.42%) in comparison to when it is excluded 0.2702 (27.02%). This is an indication that corporate (board) heterogeneity plays an important role in moderating the relationship between credit risk management (non-performing loans ratio; capital adequacy ratio and; loan to deposit ratio) of banks in Nigeria.

Discussion of Findings

This research paper sought to determine the role of corporate (board) heterogeneity in the relationship between credit risk management and bank's financial performance in Nigeria. For the purpose of this

research, the ex post facto research design was adopted and data collected through the process of contents analysis from a sample of 10 deposit money banks for a period of ten (10) years from 2010 to 2019. Data collected from the audited annual reports of the banks included those on; credit management captured as non-performing loans ratio (NPLR); capital adequacy ratio (CADR); and loan to deposit ratio (LDPR) while financial performance was measured in terms of net income margin (NIMG). Corporate (board) heterogeneity was proxied using board of directors' gender diversity (GNDV). Two panel least squares models were specified to determine the extent of effect of corporate heterogeneity on the relationship between the dependent and independent variables. Thus, the effect sizes from both models were of particular interest in the research outcome.

From the findings of the research, it is shown that corporate (board) heterogeneity plays an important role in moderating the relationship between credit risk management activities of banks and their financial performance in terms of net profit margin (NPMG). This is as size effect in terms of coefficient of determination (R^2) for the moderating role is significantly larger 40.42% compared to 27.02% when excluded. The implication of the above is that board of directors that are diversified in terms of have a balance in representation between members of both gender is an important determinant in banks' credit risk management activities. For example, such a gender diversified board of directors would be more sensitive to issues relating unhealthy non-performing loans levels in the bank. Sensitivity would presume that the board would demand that action be taken to reduce the risk exposure relating to non-performing loans and other credit risk items in the banks' balance sheet. Thus Wahid (2012) citing (Bebchuk and Weisbach, 2010) stated that benefits of diversity (heterogeneity) is realized through better and greater access to resources and information as well as increased board independence through perspective (opinion) diversification. He further asserted board heterogeneity also increases independence which is important for tough and important discussions, leading to improved outcomes.

Conclusions and Recommendations

This research has reaffirmed the importance of credit risk management in order for banks to remain profitable. In all cases involving credit risk management, the findings remain consistently statistically significant - no matter the direction (sign) of the relationship. Thus, it is concluded that credit risk management is an important determining factor in the financial performance of banks. This is more so where the board of directors is suffused with a higher degree of individuals with diverse backgrounds and qualifications as they are able to enrich deliberations and decisions with their diversified backgrounds as well as being more sensitive to risk exposure that the organisation may be unduly exposed to. Furthermore, such boards are not easily cowed or influenced by any person or opinion and are likely to be more outspoken for the benefit of the organisation. Thus, it is recommended that banks ensure that their boards of directors are adequately diversified. This can start by increasing the number of women in the board of directors. Secondly, the inclusion of more independent board members is also recommended. Regulators of the industry can also be instrumental in ensuring that banks constitute heterogeneous boards of directors by taking policy directed positions on the issue. Finally, it is recommended that banks review the policy of non-performing loan ratio to determine why it has an adverse effect on banks' effect financial performance.

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